

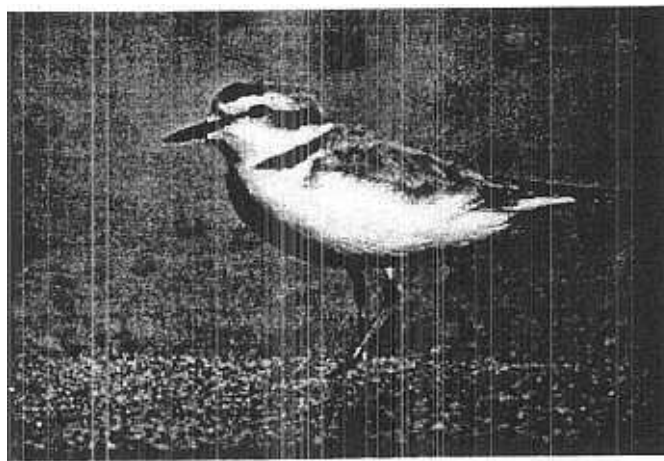
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**DISTRIBUTION, PROTECTION AND REPRODUCTIVE  
SUCCESS OF SNOWY PLOVERS  
AT POINT REYES NATIONAL SEASHORE IN 2002**

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By:

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A report of  
PRBO Conservation Science  
4990 Shoreline Highway  
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## SUMMARY

In 2002, an estimated 34 -37 Snowy Plovers (*Charadrius alexandrinus*) bred within Point Reyes National Seashore (PRNS). This number was approximately the same as in 2001 (Table 1). We located 30 Snowy Plover nests in 2002, all on Point Reyes Beach (24 between Abbott's Lagoon and North Beach parking lot, and 6 from Kehoe Beach to Abbott's Lagoon). The first clutch was initiated on April 01, 2002, 1 week later than in 2001. For the second consecutive year, Snowy Plovers nested on the shore of Abbott's Lagoon where there were three nests yielding five fledglings. As in 2001, we found no Snowy Plover nests on Limantour Spit, an area historically used by Snowy Plovers. We observed no Snowy Plovers on Drake's Spit, South Beach or Lighthouse Beach where there continues to be little, if any, suitable nesting habitat that is safe from high tides and intense human recreation.

We built square exclosures around twenty of thirty nests. Due to raptor attacks on adult plovers in exclosed nests in the 2001 breeding season, we postponed the use of exclosures around nests until the end of the raptor migration. In addition, we continued the use of crow-mesh netting as tops of exclosures to prevent access by avian predators. In total, 15 clutches hatched yielding 41 chicks. The fledge rate increased from 10 fledglings in 2001(40.0%) to 17 fledglings in 2002 (41.0%), and is within the range documented at other coastal breeding sites of 30–45% (PRBO unpubl. data).

## 1.0 INTRODUCTION

In March 1993 the Pacific coast population of the Western Snowy Plover was listed as threatened by the U.S. Fish and Wildlife Service (USFWS). The population decline leading to listing was largely due to loss of habitat by encroachment of non-native vegetation, depredation pressure, and disturbance due to recreational use of beaches.

The Point Reyes Bird Observatory (PRBO) is assisting the National Park Service to reach USFWS goals of 25 pairs of breeding birds on Point Reyes Beach (USFWS 2001) by monitoring the response of Snowy Plovers to management actions in PRNS. PRBO's past Snowy Plover research in PRNS includes intensive monitoring in 1977, 1986 to 1989, and 1995 to the present. This report documents Snowy Plover nesting success at PRNS in 2002.

## 2.0 METHODS

Snowy Plovers have historically used Point Reyes Beach and Limantour Spit for nesting within Point Reyes National Seashore, Marin County, California. We separated Point Reyes Beach into four survey areas: K = Kehoe Beach entrance to Abbott's Lagoon; NP = Abbott's Lagoon to North Beach parking lot; NB = North Beach parking lot to South Beach parking lot; and SB = South Beach parking lot to Lighthouse Beach.

To prevent human disturbance to plovers, damage to pre-nesting scrapes, or attraction to nesting areas by potential predators, historical nesting territories were roped off prior to the nesting season and marked with "Area Closed Beyond This Point" signs. Incidentally, of

We calculated the total number of chicks on the beach each day as the measure of “chick exposure days” (CED). The total number of CED is equal to the sum of all live chicks on the beaches each weekday, weekend day and holiday throughout the breeding season. We summed the CED for all Saturdays, Sundays and holidays and, because we last saw chicks before the weekend on Fridays, we included half of all CED Fridays in the weekend/holiday sum and half in the weekday sum. Using CED, we calculated expected losses between weekdays and weekends/holidays. We then compared the expected weekend/holiday and weekday chick losses to our observed values (Table 8).

### 3.0 RESULTS AND DISCUSSION

The first clutch of the 2002 breeding season was initiated on April 01, one week later than in 2001. Between 34 -37 Snowy Plovers bred on Point Reyes beaches (Table 2). This range suggests that the PRNS breeding population in 2002 of a similar level to the population in 2001 (Table 2). In 2002, we found 30 nests in PRNS, 20 of which (67%) were exclosed (Tables 3 and 4). As in 2001, we limited our use of protective exclosures early in the season in an attempt to avoid possible attacks by avian predators on adults within exclosures.

All 30 nests in 2002 were located on Point Reyes Beach: 24 between Abbott’s Lagoon and North Beach parking lot (NP) and 6 between Kehoe Beach entrance and Abbott’s Lagoon (K). As in 2001 no nests were found on Limantour Spit (Table 3). In 2002, 15 of 30 clutches hatched yielding 41 chicks, 17 of which fledged. Although the percentage of clutches that hatched increased 23.5% over 2001, the percentage of chicks fledged increased by only 1.0%, leaving chick loss as the major challenge for plovers breeding on Point Reyes beaches (Table 5).

There were several instances of vandalism to signs and fencing during the 2002 breeding season. The red sensitive wildlife signs, which delineate beach closures, were destroyed seven times. The laminated dogs prohibited signs needed to be replaced 13 times throughout the season. On Kehoe Beach, between May 2 and May 3 approximately 150 feet of rope fencing and 8 – 10 pieces of re bar were removed from around an active plover nest and destroyed. A similar event took place on North Beach on the night of May 30 when the fencing surrounding an area where a male was brooding his chicks was knocked down and thrown into the ocean. Most of the re bar used in this fencing was bent and unable to be reused.

Common Ravens (*Corvus corax*) continued to be a major threat to plovers nesting at PRNS. In 2002, of 9 depredated nests, ravens took 5. Surveyors observed two distinctive pairs of ravens on North Beach. One pair was seen regularly at the south end near the parking lot. The second pair, which nested on the cliffs at Abbotts Lagoon, used the north end of the beach to forage. These ravens were seen consistently in these two territories throughout the breeding season. Unlike North Beach, Kehoe Beach was most frequented by “mobs” of ravens. In 72 full length surveys conducted on Kehoe Beach in 2002, there were only 7 where no ravens were seen. On average, 12 – 16 ravens were seen foraging

stretch of beach, 23.5% of nests were abandoned in 2001, 20.0% in 2000 and 6.3% in 1999. The last nest of 2002 (NP24) was found and exclosed on July 18, but the pair abandoned their three eggs for unknown reasons around the day they were due to hatch. Incidentally, there were many human footprints observed in the fenced area at the time of the nest check.

Three clutches were lost when high winds buried the eggs. One was a complete clutch of three eggs, and the others, with one egg each, were buried in the laying stage. Abandoned (and buried) clutches were collected in order to test for fertility and the presence of environmental contaminants.

### *Chick Fledging*

In 2002, 17 chicks fledged from 15 clutches (Table 5). This is an increase over 2001, when 10 chicks fledged from 9 clutches (Abbott and Peterlein 2001). Weekend chick loss accounted for 66.6% of the total 24 chicks lost during 2002. The percentage of chicks lost over weekends was 28.5% higher than expected values, a similar trend to 1999 and 2000, but not 2001 (Table 8). In 2002, a traffic counter was installed at the North Beach entrance. The collection of data from this counter clearly showed that visitor use on weekends was markedly higher than on weekdays (Table 9). Of the 24 chicks lost in 2002, 50% were lost within the first 7 days of hatching. Three complete broods fledged, producing a total of eight plovers.

## **4.0 MANAGEMENT RECOMMENDATIONS**

### *Plover Monitoring Protocols to Reach Population Goals*

We recommend that PRNS continue annual monitoring of the breeding population of Snowy Plovers at Point Reyes. The Draft Recovery Plan (USFWS 2001) sets a goal of 50 adult birds on Point Reyes Beach, 10 on Limantour Spit, and 4 on Drakes Spit (32 pairs). It also recommends that to sustain the population, reproductive success should be one fledged chick per male. Continued monitoring will help to determine if these population goals are being met.

### *Predator Management*

We recommend the initiation of a predator management plan. This plan should focus on diurnal species such as Northern Harrier, Red Tailed Hawk, and Peregrine Falcon (*Falco peregrinus*), as well as nocturnal predators such as Great Horned Owl (*Bubo virginianus*), Barn Owl (*Tyto alba*), and mammals including grey fox, coyote and bobcat. This plan should specifically focus on taking a population inventory of species in the area, identifying nest sites of species nesting near plover beaches as well as locating owl roosts. Because Common Ravens were found to be the cause of 55.5% of clutch depredation in the 2002 breeding season, the plan should address methods of reducing clutch predation by this species.

Table 1. Numbers of adult Snowy Plovers on surveys of Point Reyes National Seashore in 2002.

Date	Number of Individuals by Plot <sup>1</sup>						
	K	NP	NB	SB	L	D	Total
3/13-16	-	3	-	-	54	-	57
3/19-22	27	11	-	-	47	-	85
3/26-27	24	12	0	0	20	0	56
3/30	14	18	-	-	-	-	32
4/2-4	23	8	-	-	44	-	75
4/9-13	20	15	0	0	21	0	56
4/16-18	12	10	-	-	20	-	42
4/23-27	15	14	0	0	26	0	55
5/1-2	4	14	-	-	14	-	32
5/4	2	12	-	-	-	-	14
5/6-8	2	14	-	-	5	-	21
5/9-11	4	13	-	-	2	0	19
5/14-15	6	15	-	-	0	-	21
5/18	2	12	-	-	-	-	14
5/21-22	4	13	-	-	0	-	17
5/23	3	5	-	-	-	-	8
5/24	1	12	-	-	-	-	13
5/25	1	15	-	-	-	-	16
5/26-30	4	16	0	0	0	0	20
6/4 - 7	6	17	-	-	-	-	23
6/13 - 17	11	9	-	-	0	-	32
6/29 - 30	10	3	-	-	0	-	13
7/2 - 5	4	20	-	-	0	-	24
7/13 - 16	0	8	-	-	20	-	28
7/25 - 31	5	27	-	-	13	-	45
8/-8/9	0	22	-	-	13	-	35
8/12-8/17	0	31	-	-	13	-	44
8/20-8/23	0	57	-	-	10	-	67
8/26-8/30	11	68	-	-	10	-	89

<sup>1</sup> K = Kehoe Beach to Abbott's Lagoon

NP = Abbott's Lagoon to North Beach parking lot

NB = North Beach parking lot to South Beach parking lot

SB = South Beach parking lot to Lighthouse Beach

L = Limantour Spit

Table 7. Number, dates and ages of chicks lost and possible contributing factors to mortality at Point Reyes National Seashore in 2002.

Date Lost	Weekend Loss <sup>1</sup>	Nest ID# <sup>2</sup>	Number of Chicks Lost	Chick Age <sup>3</sup> (days)	Wind Speed <sup>4</sup> Low/High (Knots)	Peak # Lighthouse Visitors <sup>5</sup>	Known Disturbance or Predators Observed in Area
8-9 May	No	NP01	1	1	7.5/10.3	350	None known
15-16 May	No	NP01	1	9	2.5/7.0	310	Northern Harrier hunting along the fore dune. Preys on Semipalmated Plover roosting on beach.
5-6 June	No	NP09	1	7	10/12	204	None known.
30 June- 1 July	Yes	NP13	2	6	12/14	900	Common Raven foraging.
11-12 July	No	NP16	2	7	1.1/3.5	551	Human footprints in closed area..
21-22 July	Yes	NP17	2	18	3.3/5.7	895	11 Common Ravens foraging on dead gull.
6-8 July	Yes	NP18	3	1	8.2/12.1	1222	None Known.
21-22 July	Yes	NP19	1	3	3.3/5.7	551	11 Common Raven foraging on dead gull.
29-30 July	No	NP19	1	12	0.1/0.6	600	None known.
18-19 Aug.	Yes	NP23	1	12	No Data	500	None known.
19-20 May	Yes	K02	1	2	5.3/6.6	No data	None known.
26-27 May	Yes	K02	1	9	5.5/6.8	770	Northern Harrier hunting over dunes, Red-tailed hawk perched in dunes.
2-3 June	Yes	K02	1	17	12/15	420	Human footprints in closed area where male had been with chicks.
5-6 June	No	K04	1	8	10/12	204	14 Common Ravens foraging on beach.
1-2 June	Yes	K05	2	6	13/17	420	None known.
15-16 June	Yes	K06	1	1	6/7	1100	Dog tracks along upper beach.
18-19 June	No	K06	1	4	7.5/8.5	closed	None known.
21-22 June	Yes	K06	1	7	10/12	530	36 Common Ravens foraging on dead Common Murre.

<sup>1</sup> Weekend is defined as Friday afternoon through Sunday and holidays.

<sup>2</sup> NP = Abbott's Lagoon to North Beach parking lot; K = Abbott's Lagoon to Kehoe Beach trailhead

<sup>3</sup> Age is number of days past hatch when chick was believed to be lost and is calculated as mid-point between two brood checks when a reduction in brood size was determined.

<sup>4</sup> Weather data collected by NOAA Buoy #46013 located in Bodega Bay.

<sup>5</sup> Visitor numbers gathered from Lighthouse visitor center logbook. Numbers are not meant to represent the actual numbers of visitors to Point Reyes beaches, but rather potential visitors in the area on any given day.

Table 9. Visitor data collected from traffic counter at the North Beach entrance.

Week #	Date <sup>1</sup>	Total Number of Cars for Week	Average # Cars/Weekday	Average # Cars/Weekend	Ratio of Weekend/Weekday
1	5/26/02	954	40.40	376.0	9.3069
2	6/02/02	440	31.00	142.50	4.5968
3	6/09/02	1154	84.20	366.50	4.3527
4	6/16/02	1497	102.20	493.00	4.8239
5	6/23/02	601	52.80	168.50	3.1913
6	6/30/02	717	53.00	226.00	4.2462
7	7/07/02	1730	125.80	550.50	4.3760
8	7/14/02	1254	84.20	416.50	4.9466
9	7/21/02	1117	64.20	398.00	6.1994
10	7/28/02	915	61.60	303.50	4.9269
11	8/04/02	1488	97.20	501.00	5.1543
12	8/11/02	1547	102.40	517.50	5.0537
13	8/18/02	1556	100.20	527.50	5.2645
14	8/25/02	1523	124.40	450.50	3.6214
15	9/01/02	2084	140.40	691.00	4.9217

<sup>1</sup> Date is Sunday and reflects total number of cars per week.



FIGURE 2. Location of 2002 Snowy Plover Nests on Kehoe Beach, Point Reyes National Seashore.

